

Claims

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2 ~~Subj.~~ A method including steps for collecting aggregate information about
3 network traffic while maintaining processor load relatively constant despite substantial
4 variation in network traffic.
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7 2. A system including
8 means for collecting aggregate information about network traffic; and
9 means for maintaining processor load relatively constant for said means for
10 collecting despite substantial variation in network traffic.
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12 3. A system, including
13 an input port for receiving network packets;
14 a sampling element for selecting a fraction of those packets for review, said
15 sampling element including a feedback element for adaptively altering said fraction;
16 a queue of selected packets;
17 a packet-type detector coupled to said queue; and
18 a frequency measurement element coupled to said packet-type detector.
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20 4. A system as in claim 3, wherein said feedback element is responsive
21 to a length of said queue.
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1 5. A system as in claim 3, wherein said feedback element is responsive
2 to a load on said frequency measurement element.

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4 6. A system as in claim 3, wherein said feedback element is responsive
5 to a frequency measure determined by said frequency measurement element.

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7 Subj. A method, including steps for sampling a set of packets at a network
8 interface of a switch, said steps for sampling including steps for adaptively altering a
9 fraction of said packets for selection.

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11 8. A method as in claim 7, wherein said steps for adaptively altering a
12 fraction of said packets for selection include steps for
13 maintaining a queue of selected packets;
14 altering said fraction in response to a length of said queue.

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16 9. A method as in claim 7, wherein said steps for adaptively altering a
17 fraction of said packets for selection include steps for
18 measuring a frequency of packets of a known type within said selected
19 packets;
20 altering said fraction in response to a load imposed by said steps for meas-
21 uring.

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1 10. A method as in claim 7, wherein said steps for adaptively altering a
2 fraction of said packets for selection include steps for altering said fraction in response to
3 two or more factors responsive to said selected packets.

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5 11. A method as in claim 7, including steps for determining a frequency
6 of packets of a known type within said selected packets.

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8 12. A method as in claim 11, including steps for determining an error
9 range for said measured frequency.

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13. A method as in claim 11, including steps for
14 setting a control parameter;
15 sampling said received packets in response to said control parameter, to
16 provide a queue of sampled packets;
17 comparing a length of said queue with a threshold;
18 altering said control parameter in response to said threshold.

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20 14. A method as in claim 13, wherein said control parameter is a fraction
21 of said received packets to sample for said queue.

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23 15. A method as in claim 13, wherein said threshold includes at least one
24 of: a lower bound for said length, an upper bound for said length.

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2 16. A method as in claim 13, wherein said threshold includes a lower
3 bound for said length and said steps for altering said control parameter operate to
4 lengthen said queue in response to said steps for comparing.

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6 17. A method as in claim 13, wherein
7 said control parameter is a fraction of said received packets to sample for
8 said queue;

9 said threshold includes a lower bound for said length; and
10 said steps for altering said control parameter decrease said control parame-
11 ter in response to said steps for comparing.

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13 18. A method as in claim 13, wherein said threshold includes an upper
14 bound for said length and said steps for altering said control parameter operate to shorten
15 said queue in response to said steps for comparing.

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17 19. A method as in claim 13, wherein
18 said control parameter is a fraction of said received packets to sample for
19 said queue;
20 said threshold includes an upper bound for said length; and
21 said steps for altering said control parameter increase said control parameter
22 in response to said steps for comparing.

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2 20. A method as in claim 13, wherein said steps for altering said control
3 parameter operate to maintain said control parameter constant for at least a selected num-
4 ber of sampled packets.

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6 21. A method as in claim 13, wherein said steps for sampling do not
7 produce skew.

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